

AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended): A production method of a high purity silica glass crucible, wherein a purity of the melted silica glass layer is increased by applying a voltage between a mold and an arc electrode to move impurity metals being contained in the melted silica glass layer to the peripheral side, when the silica glass crucible is produced by arc plasma heating a raw material powder of the silica in an inside of a hollow rotary mold, the method ~~comprising~~; comprising:

carrying out an arc melting until a thickness of the formed glass layer becoming more than 5 mm and a thickness of the un-melted silica powder layer becoming less than 2 mm, keeping an arc electrode potential within ± 500 V during the arc melting, and applying the voltage from -1000 V to -20000 V to the mold being insulated to the ground.

Claim 2 (Original): The production method according to Claim 1, wherein a resistance of the un-melted silica powder layer and the formed glass layer is less than 50000Ω .

Claim 3 (Original): The production method according to Claim 1, wherein the quantity of electricity flowing during said voltage applying is more than $13 \text{ C} / \text{m}^2$.

Claim 4 (Currently Amended): The production method according to Claim 1, the method ~~comprising;~~ comprising:

applying the voltage to the melted silica glass while heating the silica glass crucible at more than 1900 degree C, to decrease the impurity in the depth of less than 1 mm from the inside surface of the crucible.

Claim 5 (Original): The production method according to Claim 1, wherein the time for applying said voltage is less than 70% to the whole time for the arc melting, and said applying time zone is between the middle stage and the final stage of the arc melting.

Claim 6 (Currently Amended): The production method according to Claim 1, the method ~~comprising;~~ comprising:

isolating between the arc electrode and the mold by
covering substantially an upper end of the mold facing to the arc electrode
with the silica glass, or
installing a silica ring having a height of more than 50 mm from the upper end of the mold along with an inner circumference of the mold.

Claim 7 (Currently Amended): The production method according to Claim 1, the method ~~comprising;~~ comprising:

the natural silica powder, in which the concentration of Na, K, Li, and Fe being contained as impurities is more than 0.1ppm, is accumulated on the inside surface of the mold, and the high purity synthetic silica powder is accumulated onto the natural silica powder.

Claim 8 (Original): A silica glass crucible for pulling a silicon single crystal being produced by Claim 1, wherein at least each content of Na and Li being contained in the depth of 1 mm from the inside surface is less than 0.05 ppm respectively.

Claim 9 (Currently Amended): ~~The~~ A silica glass crucible according to for pulling a silicon single crystal being produced by Claim 1, wherein each content of Na, Li, K, and Fe being contained in the depth of 1 mm from the inside surface is less than 0.05 ppm respectively, and Cu being contained in said depth is less than 0.01 ppm.

Claim 10 (Original): A silica glass crucible for pulling a silicon single crystal being produced by Claim 7, wherein a natural silica powder is used in the outside of crucible, a high purity synthetic silica powder is used in the inside of crucible, and at least each content of Na and Li being contained in the depth of 1 mm from the inside surface is less than 0.05 ppm respectively.

Claim 11 (Currently Amended): A pulling method of a single silicon crystal comprising pulling the single silicon crystal from a silica glass crucible, wherein the silica glass crucible is produced according to the method of Claim 1 ~~is used when the single silicon crystal is pulled.~~

Claim 12 (Original): A silicon single crystal pulled by the method according to Claim 11.

Claim 13 (Currently Amended): The production method according to Claim 1, the method ~~comprising~~; comprising:

the high purity silica powder layer is accumulated on the inside surface of the mold, and, as heating said layer by arc plasma, the high purity synthetic silica powder is fed and its melt is deposited onto said layer.

Claim 14 (Original): The production method according to Claim 13, wherein a resistance of the un-melted silica powder layer and the formed glass layer is less than 50000Ω .

Claim 15 (Original): The production method according to Claim 13, wherein the quantity of electricity flowing during said voltage applying is more than $13 \text{ C} / \text{m}^2$.

Claim 16 (Currently Amended): The production method according to Claim 13, the method ~~comprising~~; comprising:

applying the voltage to the melted silica glass while heating the silica glass crucible at more than 1900 degree C, to decrease the impurity in the depth of less than 1 mm from the inside surface of the crucible.

Claim 17 (Original): The production method according to Claim 13, wherein the time for applying said voltage is less than 70% to the whole time for the arc melting, and said applying time zone is between the middle stage and the final stage of the arc melting.

Claim 18 (Currently Amended): The production method according to Claim 13, the method ~~comprising~~; comprising:

isolating between the arc electrode and the mold by
covering substantially an upper end of the mold facing to the arc electrode
with the silica glass, or
installing a silica ring having a height of more than 50 mm from the upper end
of the mold along with an inner circumference of the mold.

Claim 19 (Currently Amended): ~~The~~ A silica glass crucible ~~according to~~ for pulling a
silicon single crystal being produced by Claim 13, wherein each content of Na, Li, K, and Fe
being contained in the depth of 1 mm from the inside surface is less than 0.05 ppm
respectively, and Cu being contained in said depth is less than 0.01 ppm.

Claim 20 (Original): A silica glass crucible for pulling a silicon single crystal being
produced by Claim 13, wherein a natural silica powder is used in the outside of crucible, a
high purity synthetic silica powder is used in the inside of crucible, and at least each content
of Na and Li being contained in the depth of 1 mm from the inside surface is less than 0.05
ppm respectively.

Claim 21 (New): A pulling method of a single silicon crystal comprising pulling the
single silicon crystal from the silica glass crucible of Claim 8.